

JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(12) Publication number 4-38248

(43) Date of publication of application: 07.02.92

(51) Int.Cl B60S 1/48
B 8211-3D

HEATING DEVICE FOR WINDOW CLEANERS' LIQUID

21/ Application 2-142196

22/ Application date 30/05/90

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Details:

1. Invention title:

Heating device for window cleaners' liquid

2. Sphere of patent's claim

This is a heating device for window cleaners' liquid and it consists of the following items:
A device for temperature detection to detect a temperature in a car; a comparison circuit to compare the prescribed fixed values with those ones that were detected with the device for temperature detection; a heating means to heat the window cleaners' liquid and it is switched due to circuit switching devices that switch the circuits (that are closed to engine) for the cleaners' liquid of window cleaners' liquid when a result of comparison data obtained from comparison circuit shows that the detected by this way values are becoming lower than prescribed fixed values; a device for circulation of using the window cleaners' liquid in some certain periods and for circulation of overheating of window cleaners' liquid when it is not spouted to the window glass.

3. Detailed description:

1. Invention title: Car windows cleaner

(Fields for invention's application in industry)

This invention is connected with heating devices for window cleaners' liquid only during the cold seasons to perform a removing of ice and etc from front glass by heating and switching the circuits (that are closed to engine) for the cleaners' liquid of window cleaners' liquid.

(Future technology)

A circuit scheme of the jetting device for window cleaners' liquid is shown on the diagram 4. And on the diagram 4 the following items are shown: 1 – a battery for using in a car, 2 – an ignition switch, 3 – a switch for jetting of window cleaners' liquid, 4 – a motor that drives a pump to drive a jetting pump and all the devices are connected in series with the negative and positive poles of the battery for using in a car.

An explanation scheme of the circuits for the cleaners' liquid is shown on the diagram 5. And on the diagram 5 the following is shown: due to driving of non-shown pump that is driven by the prescribed pump driving motor 4, the window cleaners' liquid that is stored in a tank 48 for window cleaners' liquid and it is jetted through a tube 39 by a pair of the nozzles 42 L and 42 R.

The next is explanation of the device operation. When the ignition switch 2 is turned on the engine starts.

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Next, when the switch 3 for jetting of window cleaners' liquid is turned on, the pump driving motor 4 starts to work and the window cleaners' liquid that is stored in a tank 48 for window cleaners' liquid and it is jetted through a tube 39 by the nozzles 42 L and 42 R to the front glass.

(Problems to be resolved)

The present device for jetting of window cleaners' liquid is constructed as it was shown above. So without any connection what season it is, winter or summer, an unheated window cleaners' liquid is jetted from the tank 48 through a tube 39 by the nozzles 42 L and 42 R.

By the way there usually are some problems when in cold season an ice or snow is stuck to the front glass and operating of window wipers becomes difficult and that creates problem for driving.

There is a technology of the patent 62-268722 that is close to the invention.

The invention aims to propose the some method to resolve such problems and only for cold season the window cleaners' liquid is heated and the following device is proposed for heating of window cleaners' liquid to remove an ice or snow is stuck to the front glass.

(Means to resolve these problems)

The device for heating of the window cleaners' liquid is constructed from the following items: a device for temperature detection to detect a temperature in a car; a heating device for heating and switching the circuits (that are closed to engine) for the cleaners' liquid of window cleaners' liquid and the device of switching circuits for circulation of using the window cleaners' liquid in some certain periods

(Effects)

In this invention when a temperature in a car, detected by the temperature detection device falls lower than the prescribed fixed values, so the ignition switch is turned on and due to the switching device for certain period, the circuit of window cleaners' liquid is switched to the tube that is close to the engine and the heating device controls the certain increasing

heated and when the switch for jetting of window cleaners' liquid turns on, the heated window cleaners' liquid is jetted to the front glass.

Examples of application)

Next is the detailed explanation of examples of the invention operation of the device for heating of window cleaners' liquid with reference to diagrams.

On diagram 1 the circuit scheme of the construction for application is shown. On the diagram 1 the following items are shown: 1 – a battery for using in a car, 2 – an ignition switch, 3 – a switch for jetting of window cleaners' liquid, 4 – a motor that drives a pump. These devices are the same as on the diagram 4

The ignition switch 2, the pump driving motor 4 and connection point 9a of relay (usually open point) are connected in series with the negative and positive poles of the battery 1 for using in a car.

5 and 6 are the circuit switching solenoid valves to switch the respective circuits of window cleaners' liquid. Each end of those circuit switching solenoid valves 5 and 6 is connected in the connection point P with the ignition switch 2 and the pump driving motor 4.

The other end of those circuit switching solenoid valves 5 and 6 is connected with each collector of the transistors 29, 30 within the respective controlling part 8.

In the same way the circuit switching solenoid valve 7 is connected between the connection point P and the collector of the transistor 31. This circuit switching solenoid valve 7, when the jetting of window cleaners' liquid is not activated, switches the circuit for circulation of using window cleaners' liquid

On one hand, 10 is a thermistor that acts as a device for temperature detection to detect a temperature in a car. One end of the thermistor is connected with input terminal (+) of the comparator 16. The other end of the thermistor is connected with input terminal of regulator 13. The input terminal (+) of the comparator 16 is connected through resistance 19 with the negative poles of the battery for using in a car (below it is mentioned as a ground line L). The input terminal (-) of the comparator 16 is connected through resistance 17 with the other end of the thermistor 10 and through resistance 18 is connected with the ground line L. So the scheme is constructed of a comparison circuit 15 to compare the prescribed fixed values with the temperature inside the car with comparator 16 and resistances 17~19.

In the comparison circuit 15 the resistances 17, 18 are ones for determine a voltage with

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the fixed value. And due to that the resistances 19 is connected in series with the thermistor 10, so it is resistance that generates a voltage of temperature in the car.

As above the output terminal of the comparator 16 is connected with the base of the switching transistor 37. The emitter of transistor 37 is connected with the input terminal of the regulator 11 and the collector through the resistance 27 in timer circuit 20 is connected with the switching transistor 21.

OF a temperature of window
cleaner's liquid & due to that
window's cleaners' liquid.

The switching transistor 21 and the switching transistor 22 are mutually switched. And the base of the switching transistor 21 through a condenser 26 is connected with the collector of the transistor 22.

And the base of the switching transistor 22 through a condenser 23 is connected with the collector of the transistor 21.

The collector of the switching transistor 22 through the resistance 28 and the bases of both of the switching transistor 21 and 22 are respectively through the resistances 24 & 25 connected with the above collector of the transistor 37.

This timer circuit 20 is consisted of transistors 21, 22; resistances 23, 24, 25, 27, 28 and the condensers 23, 26. And due to the well-known construction of multi-vibrators, the resistances 24, 25 and the condensers 23, 26, the circulation period of using of the window cleaners' liquid is set. Thus the resistances 27, 28 limit the current.

And the above collector of the transistor 37 is respectively through the resistances 33, 34 connected with the bases of the transistors 29, 30.

The transistors 29 ~ 31 become the drivers to drive the switching solenoid valves 5 ~ 7 for the respective circuits. The emitters of the transistors 29 ~ 31 are connected with the ground line L.

And the collector of the transistor 21 of the above timer circuit 20 through the resistance 36 is connected with the base of the transistor 22, and it is connected with diode 38 (used for preventing of surge voltage) and the switch 4 for jetting the window cleaners' liquid.

The collector of the transistor 32 is connected with the connection point P through relay coil 9b, and it connected with the ground line L through the switch 3 for jetting the window cleaners' liquid.

And the collector of the transistor 21 of the above timer circuit 20 through the resistance 35 is connected with the base of the transistor 31.

And the above stabilization current circuit 11 is constructed from the regulator 13 and condensers 12, 14. The condenser 12 absorbs the noise and the condenser 14 absorbs the ripple. Those condensers 12, 14 are connected with the regulator 13 and the ground line L.

The diagram # 2 – a circuit scheme of circuits for cleaners' liquid. Due to the pump driving motor 4, the pump is driven and the window cleaners' liquid stored in the tank 48 is circulated.

The tank 48 is connected through the tube 47 for window cleaners' liquid with the circuit switching solenoid valve 7, and the valve 7 through the tube 41 for cleaners' liquid is connected with the nozzles 42L and 42R.

And the circuit switching solenoid valve 7 through the tube 40 for cleaners' liquid is connected with the solenoid valve 6. And the circuit switching solenoid valve 6 through the tube 39, 46 for cleaners' liquid is connected with the circuit switching solenoid valve 5 and the valve 5 is connected with the above tank 48.

The tube 46 for window cleaners' liquid is laid on non-shown side of the engine and receives the radiant heat from the engine and heats the cleaners' liquid to circulate inside. And the heating device consists of the circuit switching solenoids 5, 6 and the tube 46 for cleaners' liquid.

And the circuit switching solenoid valves 5 ~ 7 are constructed as shown on the diagram 3. It is a sectional plan. And the circuit switching solenoid valve 6 is shown as

representative one. As shown on the diagram 3 a bottom of the valve is through the spring 44 pushed up in its top by the spool 45.

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The plunger 43 is connected with the spool 45. The plunger 43 is attached to the coil 46, and on the contrary to flexibility of the spring 44 it is pushed down.

According to the positions of the coil 46 switching is performed in: way A & way B, way A & way C. The way A is connected with the tube 40 for cleaners' liquid on the diagram 3, the way B and way C are respectively connected with the tube 39, 46 for cleaners' liquid.

Next is explanation of the device operations. When the ignition switch 2 is turned on, the current runs into the controlling part 8, and due to the stabilization current circuit 11 the stabilized current is obtained and in the input terminals (+) of comparator 16, due to the thermistor 10 and the resistance 19, voltage is appeared to show a divided temperature inside the car. In the input terminals (-) of comparator 16, due to the resistance 17, 18, voltage is appeared to show a divided fixed temperature.

When a temperature inside the car is high than fixed one, namely, when there is not any ice or snow on the front glass, so the comparator 16 keeps the H level, the transistor 37 is in off position, the timer circuit 20, neither of the transistors 29 ~ 32 for driving in on position, the circuit switching valve solenoids 5 ~ 7 are totally in off position.

In such position, when the switch 3 for jetting of the window cleaners' liquid is turned on, so the current is passed to the relay coil 9b, the connection point 9a of the relay is turned on, and the pump driving motor starts to work.

Let's to explain the running ways of the window cleaners' liquid in that time on diagrams 2 and 3. The circuit switching solenoid valve 7 on diagram 3 is connected with A way and B way, cleaners' liquid inside the tank 48 is passed through the tubes 39, 40, 41 of cleaners' liquid and it is jetted from jetting nozzles 42 L, 42 R.

As for position of the circuit switching solenoid valve 7 in that time, because a temperature inside the car is above fixed level, so the plunger 43 is pushed up by a spline 44, due to the spool 45 C way is closed and the circuit switching solenoid valve 7 connects from A way to B way and the circuit switching solenoid valve 6 - from B way to C way.

Next, when a temperature falls down inside the car, so due to the thermistor 10 and the resistance 19 the divided voltage becomes lower than the divided voltage from the resistances 17, 18. At the moment output of comparator 16 reaches L level and the emitter of the transistor 37 is connected with the collector, the current is passed to the bases of the transistors 29, 30, and the collectors of transistors 29, 30 are connected with emitters, the current starts to run in the circuit switching solenoid valves 5, 6, the systems is turned on.

And in the timer circuit 20 the current is supplied from the stabilization current circuit 11 through the transistor 37. So during the certain time between the condenser 23 of the timer circuit 20 and the resistance 24 and during the certain time between the condenser 26 and the resistance 25, the transistors 21, 22 switch mutually and by one passing, non-passing of current between the collectors and emitters.

When the transistor 21 does not pass, so due to the stabilization current circuit 11 in the bases of transistors 31, 32, the current is relatively passed through transistor 37, the resistance 27, 35, 36, and the transistors 31, 32 are turned on.

Due to that the transistor 31 is turned on, the circuit switching solenoid valve 7 is turned on, and due to that the transistor 32 is turned on, the relay 9b is turned on and the connection point of the relay 9a is turned on.

Due to that the connection point of the relay 9a is turned on, the pump driving motor 4 is turned on, thus window cleaners' liquid is jetted from the tank 48 to circuit solenoid valve 5.

Conversely when the transistor 21 passes between its collector and emitter, so the current does not pass to bases of the transistors 31, 32, the circuit switching solenoid valve 7 and the relay 9b is turned off, the pump driving motor 4 does not start to work.

If we explain the position on diagram 2, due to that the circuit switching solenoid valves 5, 6 are turned on, so ways of window cleaners' liquid are switched to pass between the tubes 46 and 40 of cleaners' liquid.

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As for position of the circuit switching solenoid valves, it is shown on diagram 3 - due to absorption by the plunger 43, flexibility of the spring 44 is pushed down, the spool 45 is pushed down, B way is closed, C way is opened, circuit is switched.

When the transistor 21 does not pass, so due to that the circuit switching solenoid valve 7 is turned on, so circuit is switched from the tube 41 to 47 of window cleaners' liquid.

At the moment, due to the working of the pump driving motor 4, the window cleaners' liquid through the following ones: tank 5, the tube 46 of window cleaners' liquid, the circuit switching solenoid valve 6, the tube 40 of window cleaners' liquid, the circuit switching solenoid valve 7, the tube 47 of window cleaners' liquid returns to tank 48 and circulation is performed. Due to that circulation, window cleaners' liquid is overheated, when the overheated water is jetted on the cold front glass, the current is cut off. This is helpful for safety.

When in this position the switch 3 for jetting of cleaners' liquid is turned on, so as it shown on diagram 1 voltage on bases of the transistors 31, 32 reaches L level, therefore the transistors 31, 32 do not pass. At the moment the circuit switching solenoid valve 7 is turned on, in the relay coil 9b the current runs through the connection point of the switcher 3. Thus the connection point 9a of the relay is turned on, the pump driving motor 4 starts to work.

Finally as it is shown on diagram 2 when the circuit switching solenoid valves 5, 6 are turned on, so circuit switching solenoid valve 7 is off.

To prevent the cases when window cleaners' liquid is overheated the circulation device is designed that performs circulation checking according to the timer circuit 20. A temperature of window cleaners' liquid is checked and the pump driving motor 4 is run. Also returning to the invention applications. Even it was said only about jetting of window cleaners' liquid to the front glass, I think it possible to use the system for rear glass.

(Invention results)

As it was mentioned above, this invention applies heating devices for window cleaners' liquid not only during the cold seasons to perform a removing of ice and etc from front glass or to rear glass

4. Brief explanation of diagrams

Diagram 1 shows in brief the circuit scheme of heating device for window cleaners' liquid

Diagram 2 shows ways of window cleaners' liquid in application example.

Diagram 3 shows the sectional plan of switching solenoid valve in application example

Diagram 4 shows jetting device for window cleaners' liquid

Diagram 5 shows in brief the circuit scheme for explaining of circuits of window cleaners' liquid for jetting device for window cleaners' liquid

- 1. - a battery for using in a car
- 2. - ignition switch
- 3. - switch for jetting of window cleaners' liquid
- 4. - pump driving motor
- 5.~ 7 - circuit switching solenoid valve
- 8. controlling unit (part)
- 9a - connection point of relay
- 9b - relay coil
- 10 - thermistor
- 15 - comparison circuit
- 20 - timer circuit
- 21, 22, 29~ 32, 37 transistors
- 48 - tank
- 39 ~ 41, 47 - tubes for window cleaners' liquid

In all diagrams the same numbers are applied for the same items

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A//

- 1/ a battery for using in a car
- 2/ ignition switch
- 3/ switch for jetting of window cleaners' liquid
- 4. - pump driving motor
- 5.~ 7 - circuit switching solenoid valve
- 8. controlling unit (part)
- 9a - connection point of relay
- 10 - thermistor
- 21, 22, 29~ 32, 37 transistors

B/ Arrow (to engine side)

48 - tank
39 ~ 41, 47 - tubes for window cleaners' liquid

C/ correction of dates and signatures

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6. Corrections

1/ on page # 6 9- 10 lines are to correct as follows: " input terminal of regulator 13
" to " output terminal of regulator 13"

2/ on page # 6 14 - 15 lines are to correct as follows: " it is connected with other
end of thermistor 10 through the resistance 17" to "it is connected with the resistances 17
and 18"

3/ on page # 7 7 line is to correct as follows: " input terminal" to "output terminal"

4/ on page # 8 2 line is to correct as follows: " the resistances 23, 24, 25, 27, 28"
to " the resistances 24, 25, 27, 28"

5/ on page # 12 18-19 lines are to correct as follows: " spline 44" to "spring 44"

6/ on page # 13 2 line is to correct as follows: " C way" to "A way"

7/ on page # 15 11 line is to correct as follows: " tank 5" to "tank 48"

8/ on page # 16 6 line is to correct as follows: " turned on" to "turned off"

9/ diagram 1 is to correct as follows:

7/ List of attached documents one diagram

FIG → A-2

1/ 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1/ a battery for using in a car

2/ ignition switch

3/ switch for jetting of window cleaners' liquid

4. - pump driving motor

5.~ 7 - circuit switching solenoid valve

8. controlling unit (part)

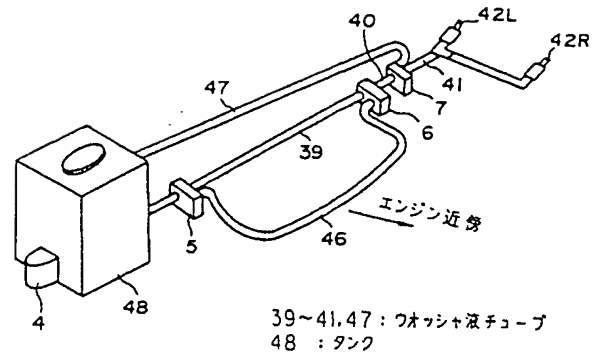
9a - connection point of relay

10 - thremistor

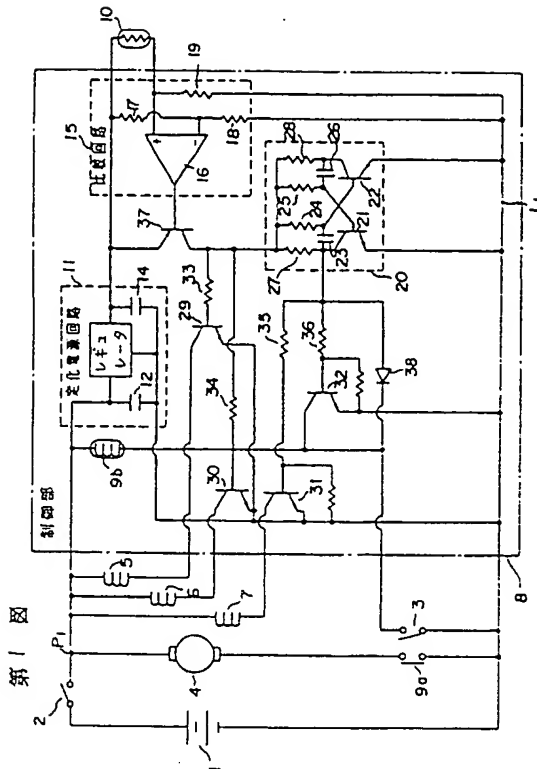
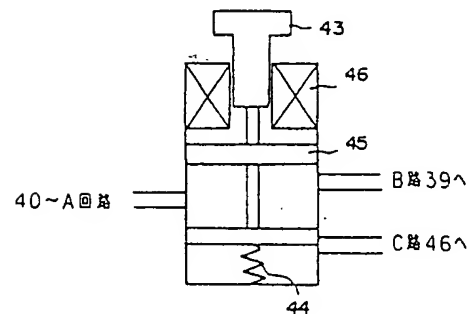
21, 22, 29~ 32, 37 transistors

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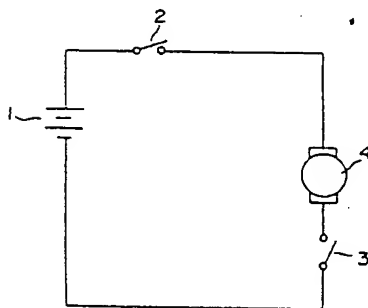
第 2 図



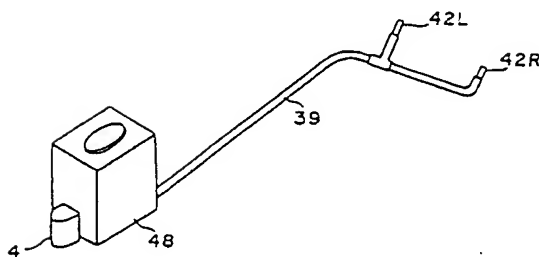
第 3 図



第 4 図



第 5 図



適

手続補正書

平成 3 年 5 月 7 日

特許庁長官殿

1. 事件の表示 特願 2-142196 号

2. 発明の名称

ウィンドウォッシャ液加温装置

3. 補正をする者

事件との関係 特許出願人
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特許第03(3213)3421特許部
(通商 03(3213)3421特許部)

5. 補正の対象

明細書の発明の詳細な説明の欄、図面。

方式
審査

特許

特許庁
3.5.9
出願
不審

6. 補正の内容

- (1) 明細書第6頁第9～10行の「レギュレータ13の入力端」を「レギュレータ13の出力端」と補正する。
- (2) 同第6頁第14～15行の「抵抗17を介して感温素子10の他端に接続されているとともに、」を「抵抗17と抵抗18に接続され、」と補正する。
- (3) 同第7頁第7行の「入力端」を「出力端」と補正する。
- (4) 同第8頁第2行の「抵抗23, 24, 25, 27, 28」を「抵抗24, 25, 27, 28」と補正する。
- (5) 同第12頁第18～19行の「スプライン44」を「スプリング44」と補正する。
- (6) 同第13頁第2行の「C路」を「A路」と補正する。
- (7) 同第15頁第11行の「タンク5」を「タンク48」と補正する。
- (8) 同第16頁第6行の「オンする」を「オフ

する」と補正する。

- (9) 第1図を別紙のように補正する。

7. 添付書類の目録

図 面

1 通

以 上

